although they are not themselves evident, are known with certainty[44] – provided only that they are deduced from true and known principles through a continuous and uninterrupted movement of thought[45] which perspicuously intuits individuals. This is no different from how we know that the last link of a long chain is connected with the first, even if we cannot, by one and the same ocular intuition, observe all the intermediate ones on which that connection depends – provided that we have surveyed them successively, and that we remember that, from first to last, the individual links are attached to the ones next to them. Therefore, we are here distinguishing mental intuition from certain deduction on the grounds that a movement or a kind of succession is conceived in the latter, yet not in the former, and, in addition, because present evidence is not necessary for deduction, as it is for intuition, but rather does deduction, in a certain manner, get its certainty from memory.[46] From these things, one gathers that, for different considerations, those propositions which one immediately concludes from first principles can indeed be said to be known, in a way through intuition, and in a way through deduction; but the first principles themselves, only through intuition; and the remote conclusions, on the contrary, only through deduction.

9. These two ways are the most certain paths to knowledge, and, from the side of the natural intelligence, no more should be admitted, but rather should all others be rejected as suspect and liable to error. This does not, however, preclude us from

[44] How can one know with certainty things which are not themselves evident? To understand this remarkable formulation, one need only notice, for instance, a fundamental feature of both American and English jurisprudence – which Descartes the jurist also might have appreciated –, namely, that 'evidence' in the forensic sense is distinguished into *direct* evidence and *indirect* evidence: an example of the former being *eyewitness identification* and an example of the latter being *circumstantial evidence*. Cf. the definition of 'evidence' in the legal sense: *Black's Law Dictionary*, ed. H. C. Black et al. (St. Paul, 1990), p. 555 ff. (including the plethora of further references). Thus, contrary to what many might think, indirect evidence based on deduction is not necessarily inferior to direct evidence based on intuition. In fact, in some cases it may even be superior, e.g., in a case where a suspect has been convicted on the basis of a victim's eyewitness testimony only to have later to be released on the grounds that they have been excluded from involvement in the crime by means of DNA-testing. By a different type, it is also possible to prove beyond a reasonable doubt that someone has committed a crime, even though there is neither an eyewitness to it nor a confession of it. While the analogy between legal evidence and 'epistemic evidence' (*lucus a non lucendo*) may not be perfect, it is interesting that Descartes does not seem to consider the possibility that, at least in some respects, the indirect evidence of deduction can be superior to the direct evidence of intuition. By the way, the position that there is no such thing as forensic *knowledge* – pace Plato, *Theaetetus*, 200 d–201 c (cf. ibid., 172 c–177 c) – is hardly to be taken seriously, for it cannot do justice to the fact that the forum of the court also represents a playground for a perfectly legitimate *Evidenzspiel*.

[45] Cf. R. 7, R. 7, § 1, R. 11, R. 11, §§ 3–4, and R. 16, § 1. Such statements (as here in R. 3, § 8) are the keys to whether, according to Descartes, deduction ultimately comes down to intuition. To the extent that deduction uses 'the continuous and uninterrupted movement of thought', it becomes like intuition, and thus certain; to the extent that it does not, it becomes like memory, and thus unreliable.

[46] Cf., first, R. 7, § 1, and R. 11, § 4, where 'the continuous and uninterrupted movement of thought' is recommended as an aid to the weakness of memory; then, R. 11, §§ 1 and 3, and R. 16, § 1, where deduction seems to be a matter of intuition; and, finally, R. 11, § 2, where the idea appears to be to salvage the distinction between intuition and deduction by means of a further distinction between 'simple and perspicuous' deduction, on the one hand, and 'multifaceted and complex' deduction, on the other hand – the former occurring through intuition and the latter depending on memory. Crucial, too, is R. 7, § 5.

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certiora credamus, cum illorum fides, quaecumque est de obscuris, non ingenii actio sit, sed voluntatis; et si quae in intellectu habeat[25] fundamenta, illa omnium maxime per alterutram ex viis jam dictis inveniri possint et debeant, ut aliquando fortasse fusius
[371] ostendemus. |

Regula IV

De methodo, mathematica, et mathesi universali

Necessaria est methodus ad rerum veritatem investigandam.[26]

1. Tam caeca Mortales curiositate tenentur, ut saepe per ignotas vias deducant ingenia, absque ulla sperandi ratione, sed tantummodo periculum facturi, utrum ibi jaceat quod quaerunt: veluti si quis tam stolida cupiditate arderet thesaurum inveniendi, ut perpetuo per plateas vagaretur, quaerendo utrum forte aliquem a viatore amissum reperiret. Ita student fere omnes Chymistae, Geometrae plurimi, et Philosophi non pauci; et quidem non nego illos interdum tam feliciter errare, ut aliquid veri reperiant; ideo tamen non magis industrios esse concedo, sed tantum magis fortunatos. Atqui longe satius est de nullius rei veritate quaerenda unquam cogitare, quam id facere absque methodo: certissimum enim est, per ejusmodi studia inordinata, et meditationes obscuras, naturale lumen confundi atque ingenia excaecari; et quicumque ita in tenebris ambulare assuescunt, adeo debilitant oculorum aciem, ut postea lucem apertam ferre non possint: quod etiam experientia comprobatur, cum saepissime videamus illos, qui litteris nunquam operam navarunt, longe solidius et clarius de obviis rebus judicare, quam qui perpetuo in scholis sunt versati. Per methodum autem intelligo regulas certas et faciles,
[372] quas quicumque | exacte servaverit, nihil unquam falsum pro vero supponet, et nullo mentis conatu inutiliter consumpto, sed gradatim semper augendo scientiam, perveniet ad veram cognitionem eorum omnium quorum erit capax.

2. Notanda autem hic sunt duo haec, nihil nimirum falsum pro vero supponere, et ad omnium cognitionem pervenire: quoniam, si quid ignoramus ex iis omnibus quae possumus scire, id fit tantum, vel quia nunquam advertimus viam ullam, quae nos

[25] H, A, AT, and SGZ: et si … habeat. C: etsi … habent. N (clause): hoewel de dingen, die hun grontvest in 't verstant hebben.

[26] H, A, AT, and C: Necessaria est methodus ad rerum veritatem investigandam. SGZ: Necessaria est methodus ad veritatem investigandam. N: Dat'er een onderwijs middel, tot d'opspeuring der waarheit nootzakelijk is. N, once again, in a marginal note to 'een': Methodus.

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believing that those things which have been divinely revealed are more certain than all knowledge, since faith in these matters is – as is all belief concerning obscure things – an act, not of the natural intelligence, but of the will;[47] and, if this faith does have foundations in the intellect, then these, more than anything else, could and should be discovered by the one or the other of the ways already mentioned, as we shall perhaps show in greater detail at some point in time.[48]

Rule Four

On Method, Mathematics, and 'mathesis universalis'

A method is necessary for investigating the truth of things.

1. Mortals are possessed by such blind curiosity that they often conduct their natural intelligence along unknown paths, without any grounds for hope, but rather merely trying to find out whether what they are seeking might lie there: as if someone were consumed with such a foolish desire to discover treasure that he would perpetually roam the streets seeking whether he might perhaps find any lost by a passerby. Thus do almost all chemists, most geometers, and many philosophers engage in their studies. Therefore, to be sure, I am not denying that they sometimes err so felicitously that they find something true; none the less, I do not concede that they are more careful, but rather only more fortunate. Yet it is still far better never to think about investigating the truth of anything than to do so without a method. For it is quite certain that, by such disordered studies and obscure meditations, the natural light is confounded and the natural intelligence is blinded. Those who are accustomed to walking in the dark thus weaken their eyesight so much that afterwards they are no longer able to bear the light of day.[49] This is also confirmed by experience, for we very often see that those who have never devoted their efforts to learned studies judge much more soundly and clearly about the matters that occur to them than do those who have always been in the schools.[50] By 'a method', moreover, I understand certain and easy rules – rules such that, if one has followed them exactly, then one will never suppose anything false to be true, and, not having uselessly wasted any mental effort, but always gradually increasing knowledge, one will arrive at the true knowledge of all those things of which one will be capable.[51]

2. But here one has to note two things, namely, that one is, of course, to suppose nothing false to be true, and that one has to arrive at a knowledge of all things. For, if we do not know something of all those things which we are capable of knowing, then this happens only either because we have never noticed a way that might lead us to

[47] Cf. R. 12, § 20.

[48] This is not done in this work, but cf. *Meditations*, AT, VII, 1–6, as well as AT, III, 349–350, IV, 162 ff., V, 159, VI, 8, VII, 249 ff. and 581, VIII/1, 329, and IX/2, 5.

[49] On *obscuritas* cf. Quintilian, *Institutio oratoria*, IV, i, 40–41, ii, 44, iv, 4, v, 25–26, V, xiv, 34, VII, vi, 2–4, x, 2, VIII, ii, 12–21, iii, 50, 57, and 82, vi, 14, X, ii, 17, and XI, iii, 39.

[50] See *Discourse*, pt. I, § 14, for a remarkably similar thought.

[51] This is Descartes' definition of 'method'; there is nothing comparable to it in the *Discourse*.

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duceret ad talem cognitionem, vel quia in errorem contrarium lapsi sumus. At si methodus recte explicet, quomodo mentis intuitu sit utendum, ne in errorem vero contrarium delabamur, et quomodo deductiones inveniendae sint, ut ad omnium cognitionem perveniamus: nihil aliud requiri mihi videtur, ut sit completa, cum nullam scientiam haberi posse, nisi per mentis intuitum vel deductionem, jam ante dictum sit. Neque enim etiam illa extendi potest ad docendum, quomodo hae ipsae operationes faciendae sint, quia sunt omnium simplicissimae et primae, adeo ut, nisi illis uti jam ante posset intellectus noster, nulla ipsius methodi praecepta quantumcumque facilia comprehenderet. Aliae autem mentis[27] operationes, quas harum priorum[28] auxilio diri-
[373] gere contendit Dialectica, hic sunt inutiles, vel potius inter impedimenta nume|randae, quia nihil puro rationis lumini superaddi potest, quod illud aliquo modo non obscuret.

3. Cum igitur hujus methodi utilitas sit tanta, ut sine illa litteris operam dare nociturum esse videatur potius quam profuturum, facile mihi persuadeo, illam jam ante a majoribus ingeniis, vel solius naturae ductu, fuisse aliquo modo perspectam. Habet enim humana mens nescio quid divini, in quo prima cogitationum utilium semina ita jacta sunt, ut saepe, quantumvis neglecta et transversis studiis suffocata, spontaneam frugem producant. Quod experimur in facillimis scientiarum, Arithmetica et Geometria: satis enim advertimus veteres Geometras analysi quadam usos fuisse, quam ad omnium

[27] A, AT, C, and SGZ: autem mentis. H: autem [regulae circa] mentis. N (phrase): Maar d'andere werkingen des geests. AT, once again, footnotes to 'Aliae … Dialectica': Aliae autem regulae, quarum auxilio mentis operationes dirigere se contendit Dialectica.

[28] A, AT, C, and SGZ: priorum. H: primum.

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such knowledge, or because we have fallen into the opposite error.[52] But, if the method does correctly explain how we have to use mental intuition in order really to avoid falling into the opposite error,[53] as well as how we have to find the deductions in order to arrive at the knowledge of all things, then nothing else seems to me to be required in order for the method to be complete, since no knowledge is obtainable except through mental intuition or through deduction, as has already been said.[54] For one cannot also extend the method so far as to teach one how one is to perform these operations themselves, because they are the simplest of all and primary, so much so, that, unless our intellect were already able to make use of them beforehand, it would not comprehend any precepts of the method itself, however easy.[55] Yet the other mental operations, which dialectic[56] claims to direct with the help of these first ones, are useless here, or rather do they have to be reckoned as hindrances, because nothing can be added to the pure light of reason which does not obscure it in some way.

3. Therefore, since the utility of this method is so great that, without it, the pursuit of learning would seem to be more harmful than helpful, I am easily persuaded that those of greater natural intelligence have already seen it in some manner – even under the guidance of nature alone.[57] For the human mind possesses something, I know not what, of the divine, in which the first seeds of useful thoughts have been sown in such a way that, however neglected and stifled by interfering studies, they often yield spontaneous fruit.[58] We encounter this in the easiest of the sciences, to wit, in arithmetic and in geometry. For we are well aware that the ancient geometers[59] employed a kind

[52] The one error is to overlook a path to knowledge that could be taken because it is there; the other is to follow a (supposed) path to knowledge that cannot be taken because it is not (really) there. Cf. a similar train of thought about underdetermination and overdetermination of questions in R. 13, §§ 9–11.

[53] Sense-perception is not a viable path to knowledge, but this has not prevented those who do not distinguish between sensible intuition and intellectual intuition from trying to take it as such.

[54] Cf. R. 3, §§ 4–9.

[55] So much for the popular interpretation of this work as prescribing those rules of the method which must be followed in order that the operations of induction and deduction might be properly performed in the first place, or – even worse – which, if followed, would guarantee, without further ado, the achievement of the truth. For, while one may argue that the author thinks that, in order to find truth, following these rules is necessary, one can hardly argue that he thinks that doing so is sufficient. The present rule precisely does *not* say: 'Sufficiens est methodus ad rerum veritatem investigandam.'

[56] Cf. R. 2, § 4, R. 10, §§ 4–5, and R. 13, § 1.

[57] Cf. Cicero, *De legibus*, bk. I, ch. 20: 'Natura duce errare nullo modo possumus.' ('Under the guidance of nature we cannot err in any manner.') Cf. also Seneca, *De vita beata*, 8, 1.

[58] Cf. § 5 of this rule. On the notion of 'primary seeds' of truth or 'seminal reasons' cf. the tradition of the Stoic doctrine of the 'logoi spermatikoi' from Zeno of Citium (ca. 362/357–264/259) via Plotinus and Augustine to Descartes: Zeno, *Stoicorum Veterum Fragmenta* (ed. J. von Arnim [New York, 1986-Reprint]), vol. I, frags. 28, 98, and 102 (cf. also vol. II, frags. 205 and 314); Chrysippus, ibid., vol. II, frag. 1027; Origen, *Contra Celsum*, bk. I, ch. 37, and IV, 48; Plotinus, *Enneads*, III, 1, 7 (cf. also IV, 4, 9); Augustine, *De Genesi ad litteram*, bk. V, ch. 7, sec. 20, and ch. 23, sec. 45, VI, 6, 10, *De trinitate*, bk. III, ch. 9, sec. 16, and *De civitate Dei*, bk. XXII, ch. 24; etc.

[59] Cf., e.g., § 5 of this rule as well as *Meditations*, AT, VII, 4 ('… Archimedes, Apollonius, Pappus …'). Since Latin has neither definite nor indefinite articles, Descartes may not be understood to be asserting that whoever was an ancient geometer was also a practitioner of the art of analysis.

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